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SURFACE VEHICLE STANDARD

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Hydraulic Master Cylinders for Motor Vehicle Brakes - Performance Requirements

RATIONALE

This set of requirements is valid for those master cylinders tested to J1153 only. It does not represent the current state of the art.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE Hydraulic Brake Components Standards Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. ***Scope***—This SAE Standard specifies minimum performance and durability requirements for master cylinder assemblies of current established designs, components of which conform to SAE Standards. It is applicable to new assemblies from commercial production and remanufacture (factory rebuild). These performance requirements are based on those generally used by individual companies in the industry and have demonstrated satisfactory component field performance.

1.1 **Type—**This document applies to both single and dual output master cylinder assemblies used in hydraulically operated brake systems of highway vehicles. It covers such cylinders where they are employed in passenger car, truck, bus, and like brake systems utilizing motor vehicle brake fluids which conform to SAE J1703.

2. ***References***

2.1 **Applicable Publication—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply,

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1153—Hydraulic Master Cylinders for Motor Vehicle Brakes—Test Procedure

3. ***Requirements***—A master cylinder assembly shall, when tested in accordance with the procedures of SAE J1153, meet the following requirements:

3.1 **Unrestricted Apply and Release—**Per procedure 5.1, the piston(s) must move smoothly throughout full design stroke after starting, and must be completely returned to its original position(s) on the fifth stroke within five s by the force of the piston return spring(s).

3.2 Venting

NOTE—Venting is the communication of reservoir pressure to the bore(s) and outlet(s) of the master cylinder by means of opening the vent port communication between the master cylinder bore(s) and reservoir(s).

3.2.1 Per procedure 5.2.1, the cylinder bore(s) shall be vented to the reservoir(s).

3.2.2 Per procedure 5.2.2, the cylinder bore(s) shall not be vented to the reservoir(s).

3.3 Residual Pressure Valve

NOTE—The requirements of 3.3 are applicable only to master cylinders which contain a residual check valve(s).

3.3.1 Per procedure 5.3.1, air shall flow through outlet port(s).

3.3.2 Per procedure 5.3.2, air at pressure below manufacturer's minimum residual valve specification shall not flow through outlet port(s) into reservoir(s), and above manufacturer's maximum specification air shall flow through outlet port(s) into reservoir(s).

3.4 Applied Leakage

3.4.1 Per procedure 5.4.1, the reservoir pressure measuring device(s) pressure(s) shall not exceed 7 kPa (1.0 psi) increase above atmospheric after 30 s ± 1 interval.

3.4.2 Per procedure 5.4.3, there shall be no drop in pressure in excess of 7 kPa (1.0 psi) after 30 s ± 1 interval.

3.4.3 Per procedure 5.4.4, there shall be no drop in pressure in excess of 345 kPa (50.0 psi) after 30 s ± 1 interval.

3.5 Fluid Displacement—Per procedure 5.5, the average fluid volume discharge at the outlet port(s) per stroke shall be as indicated by design specifications.

3.6 Replenishing

NOTE—Replenishing is the pumping of fluid from the reservoir(s) on successive strokes of the piston(s) through the replenishing port(s) and the bore(s) to the outlet(s). Per procedure 5.6, the difference in fluid volume discharge at the outlet(s) for any application shall not vary greater than 5% from the average calculated in 5.5.

3.7 Physical Strength—Per procedure 5.7, the pressure measuring device(s) shall show no abrupt decline in pressure and the cylinder shall show no sign of leakage or structural fracture.

3.8 Humidity Operation

3.8.1 Per procedure 5.8.1, the cylinder shall vent.

3.8.2 Per procedure 5.8.3, see requirements 3.1.

3.8.3 Per procedure 5.8.4, see requirements 3.4.2.

3.8.4 Per procedure 5.8.5, see requirements 3.4.3.

3.9 High Temperature Durability

3.9.1 Per procedure 5.9.1, the cylinder shall vent.

3.9.2 Per procedure 5.9.2, the leakage shall not exceed five drops (total).

3.9.3 Per procedure 5.9.3, see requirements 3.4.2.

3.9.4 Per procedure 5.9.4, see requirements 3.4.3.

3.10 Static Leakage

3.10.1 Per procedure 5.10.1, leakage shall not exceed five drops (total).

3.10.2 Per procedure 5.10.2, leakage shall not exceed five drops (total).

3.11 Cold Temperature Operation

3.11.1 Per procedure 5.11.1, the cylinder shall vent.

3.11.2 Per procedure 5.11.2, the leakage shall not exceed five drops (total).

3.11.3 Per procedure 5.11.3, see requirements 3.1 except allow 30 s maximum time.

3.11.4 Per procedure 5.11.4, see requirements 3.4.2.

3.11.5 Per procedure 5.11.5, see requirements 3.4.3.

3.12 Storage Corrosion Resistance

3.12.1 Per procedure 5.12.1, leakage at entrance to bore(s) shall not exceed five drops (total).

3.12.2 Per procedure 5.12.2, piston(s) must start to move at 222 N (50.0 lb) maximum force.

3.12.3 Per procedure 5.12.3, see requirements 3.1.

3.12.4 Per procedure 5.12.4, see requirements 3.4.2.

3.12.5 Per procedure 5.12.5, see requirements 3.4.3.

3.13 Reservoir Capacity—Per procedure 5.13, the fluid volume(s) required to fill the reservoir(s) shall be no less than the design specification for reservoir fluid capacity(s).

3.14 Reservoir Fluid Depletion—Per procedure 5.14, the master cylinder usable fluid of the reservoir(s) shall be depleted. On master cylinders incorporating a cover diaphragm(s) the convolution(s) shall be distended.

3.15 Push Rod Retention—Per procedure 5.15, the push rod shall remain intact in the piston or master cylinder (when applicable).